A BRIEF EVALUATION AND DISCUSSION OF AN IMPORTANT DEVICE IN HIGH SCHOOL SCIENCE TEACHING[1]

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"The project method of teaching" is a dilapidated term. By whatever name, though, a rose is still a rose. And enticing high school students to make models, equipment, displays, or to do a bit of research that will interpret or illustrate or demonstrate the topic of discussion, is considered by authorities today the most successful way of teaching high school science. The method not only makes science more interesting and more easily understood; it lets the teacher reach the exceptional students at both scholastic ends of the class as well as the majority in the middle; it is a very effective way to detect scientifically talented youth.

In order to encourage this method and to seek the talented, "science days" or "science fairs" have sprung up throughout the United States.

Section J of the Ohio Academy of Science sponsors the Ohio Junior Academy of Science and stages annual district science days at six universities as well as an annual state science day which is held at the annual meeting of the Ohio Academy of Science.

These science days are unique in that while the final state science day features the best projects from the six districts and the most talented students are the participants, many *district* science-day projects are exhibited by the less endowed students, occasionally even a retarded student. He does not receive a superior rating, but he gets the recognition and warm satisfaction characterizing the science day atmosphere.

Everyone receives a rating indicated by a certificate. Teachers find that slow students are as proud of their "good" ratings as the best students are of their "superior" ratings. One retarded student told his teacher that he had shown his certificate to everyone on his street and that his mother had telephoned several relatives about it!

There are no large awards to be won in these fairs. Tuition scholarships to certain universities of Ohio are given to about twenty seniors. A fifty-dollar prize is offered the school doing the best work. The most important award is that obtained by every participant—the joy of associating and conversing with others interested in one's own creative work and the self-confidence and self-respect gained by the experience.

Highly favorable and enthusiastic remarks come from the students. They enjoy seeing what other students have done. They get new ideas. They learn science. They become acquainted with the many ramifications of science through one another. They like the college atmosphere where the fairs are held.

It is quite surprising sometimes to see what these youngsters will dream up. It is startling to see how and to what extent an idea is developed by a ninth grader. It is interesting to find out what started a project idea.

A member of the National Honor Society, David Dowds of Urbana, received a superior rating for the photomicrographic work shown in figure 1. About two years ago a series of photomicrographs in a magazine caught David's interest, photography being his hobby. Shown here is a number of tissue micrographs he made with his camera and microscope. He is anxious to do a series of molds and a series of crystals next. Dave plans to major in biochemistry at Ohio State

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University next year. He says that Science Day definitely inspires interest in science in youth.

With the help of an old carpet sweeper, slightly dissected, Edward White, ninth grader at Jackson High School, melts iron in a cupola which he claims is one-half inch smaller than "the world's smallest cupola" (fig. 2). It took only three months

TABLE 1

Numbers of participants in State Science Day, April, 1953, by districts

District	Number of Students	Number of Towns	Number of Schools	Number of Projects	Percent of Total Projects
Northwest	82	20	25	66	31
Northeast	47	17	23	42	19
East	11	5	6	10	5
Central	51	8	16	51	24
Southwest	33	9	14	25	11
Southeast	22	7	9	21	10
Totals	246	66	93	215	100

TABLE 2

Percent of kinds of ratings achieved by each district

District	Percent of Superior Ratings	Percent of Excellent Ratings	Percent of Good Ratings
Northwest	44	38	18
Northeast	31	48	21
East	30	40	30
Central	37	43	20
Southwest	64	20	16
Southeast	38	57	5
Total	41	41	18

TABLE 3

Projects and ratings by subjects

Subject	Number of Projects	Percent of Total	Percent Superior	Percent Excellent	Percent Good
Botany	25	12	48	36	16
Chemistry	57	26	37	51	12
Geology	10	5	20	30	50
Math	3	1	33	67	
Physics	78	36	44	37	19
Zoology	38	18	45	37	18
Home Ec.	2	1	50	50	50
Conservation	2	1		50	

after his dad suggested the idea to get things smelting. He hopes to make an iron casting of the Boy Scout emblem this summer with his "superior" project. A profession in foundry work beckons Ed who relaxes with music—singing and band work. He anticipates going to college at Antioch. He is quite impressed with the amount of science he learned at Science Day.

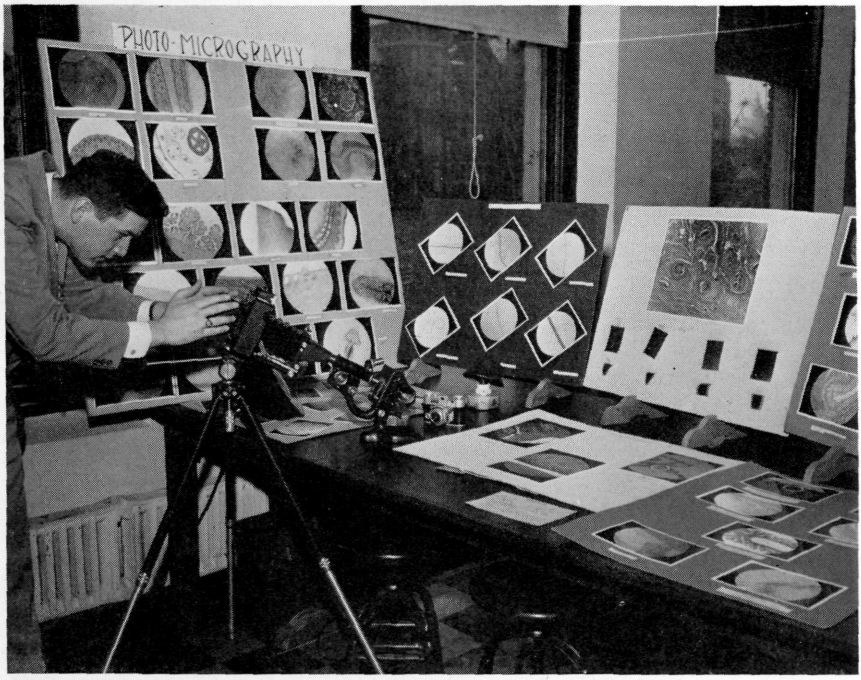

FIGURE 1

FIGURE 2

Although Richard Pavely is only a ninth grade general science student, he is already well into the science of chemistry as shown by his "superior" rated project, fig. 3. He has rigged up a neat, compact display of his knowledge of electrochemistry. His heart is set on some sort of engineering profession and he is grateful to Science Day for enabling him to get a bird's-eye view of projects in many different scientific fields. Dick, who sticks to the honor roll, is a student at Purcell High School in Cincinnati.

The labs in the Botany and Zoology building at Ohio State University were cramped quarters on Science Day, but that didn't prevent Jo Ann Brodbeck from scanning the skies with the "superior" reflecting telescope she had spent 100 hours making. It is shown in fig. 4. This Archbold High sophomore has really fallen for astronomy in a big way. Last year she made an umbrella planetarium,

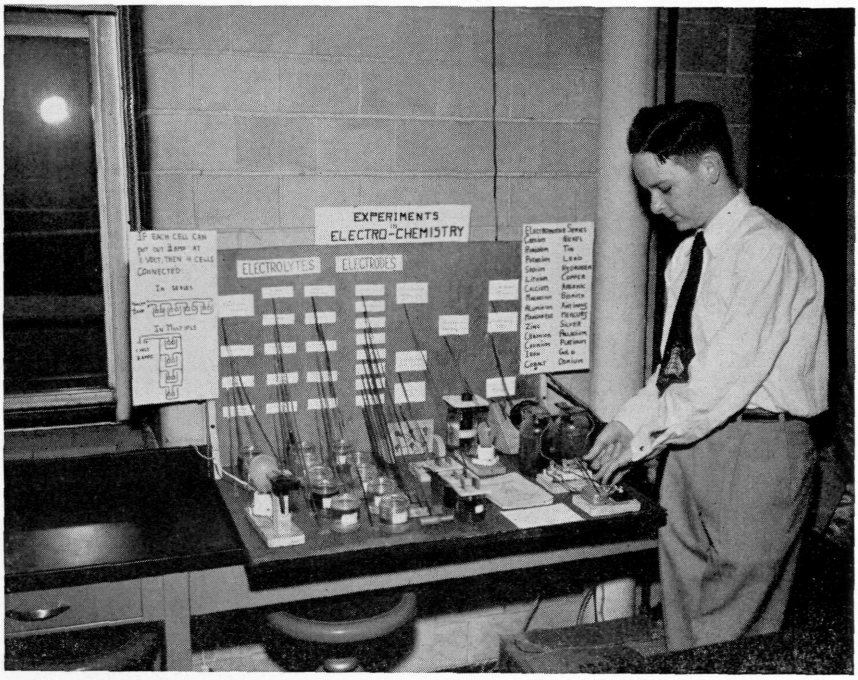

FIGURE 3

this year the telescope, and next year—well, wait and see. She's quite versatile too. She has taken state honors with her flute, took the state scholarship test in English, is pledged to the National Honor Society, and hopes to become a school teacher! Either Capital University or Wittenberg will be the lucky winner in '55.

This is merely a sampling of the splendid work displayed at the Academy Science Day this past year. Tables 1, 2, and 3 give a summary of this event. The 246 participating students represent only a part of those who exhibited projects in the district science days; and participants in the district science days represent in most schools only a small part of those who actually made projects.

Project making, I think, is the most important tool a science teacher has. A class period spent in discussing a student's project recently made is more interesting and instructive than anything I know. Projects may be assigned; they may be suggested; they may be the student's own idea. Projects can be individual

things for the introvert; they can be group undertakings for the social-minded. Projects can be simple or complex. The retarded child will enjoy making several simple projects. The superior student will think up something complex and will make it more complex before he stops, if he ever does stop. Some get their dads and even their mothers to help them. Students give each other ideas. Projects bring out preseverance in students. They are enjoyed equally by girls and boys.

FIGURE 4

Many high school teachers feel that our science days present an essential and unique opportunity in creating interest. It is not a contest; it is a very satisfying experience for all children, not just the best. "The project method" as a term is a cliché; as overt reality, it is unrivaled.